

U.S. Patent Application Serial No. 10/826,501
Response filed October 14, 2009
Reply to OA dated July 15, 2009

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (Currently amended): An electronic device having an optical system for capturing an image comprising:

a focusing mechanism for moving said optical system to an auto-focusing position or a fixed focus position;

a switch that functions as a focusing switch and also functions as a shutter switch, wherein said switch when operated orders a focusing action or orders capturing of the image; and

a controller that decides whether the optical system is in a final lens position or not during a focusing action of said focusing mechanism due to said switch, and in the case where a shutter operation of said switch is performed under a state that the optical system is not in the final lens position, shifts said optical system to a fixed focus position from an auto-focusing position and takes a fixed focus image; ~~and~~

~~an information presentation part that presents information showing that the image taken by the shutter operation is a fixed focus image,~~

wherein, during the focusing action, a focusing value is measured with an origin at a lens position where a focus position becomes an infinity, and if the measured focusing value is not smaller than a maximum focusing value, the decision is performed with making the measured

focusing value into the maximum focusing value, and

wherein said controller compares between a time required for bringing into focus in said focusing mechanism and a time from starting of the focusing action until starting of said shutter operation, and changes said optical system to said auto-focusing position or said fixed focus position based on a result of the comparison.

Claim 2 (Previously presented): An electronic device having an optical system for capturing an image comprising:

a focusing mechanism for moving said optical system to an auto-focusing position or a fixed focus position;

a switch that functions as a focusing switch and also functions as a shutter switch, wherein said switch when operated orders a focusing action or orders capturing of the image; and

a controller that decides whether the optical system is in a final lens position or not during a focusing action of said focusing mechanism due to said switch, and in the case where a shutter operation of said switch is performed under a state that the optical system is not in the final lens position, shifts said optical system to a fixed focus position from an auto-focusing position and takes a fixed focus image,

wherein said controller compares between a time required for bringing into focus in said focusing mechanism and a time from starting of the focusing action until starting of said shutter operation, and changes said optical system to said auto-focusing position or said fixed focus position

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based on a result of the comparison.

Claim 3 (Original): The electronic device of claim 1, wherein said switch is provided as a first switch, and a switch which is used in photographing by a fixed focus is also provided as a second switch separated from the first switch.

Claim 4 (Original): The electronic device of claim 1, wherein said switch functions as said focusing switch at a state of a half-push and functions as said shutter switch at a state of a full-push.

Claim 5 (Currently amended): The electronic device of claim 1 further comprising:
a first housing part that has said optical system ~~imaging part~~;
a second housing part that has said switch; and
a coupling part that couples said first housing part and said second housing part so that the first and second housing parts can be folded up.

Claim 6 (Currently amended): An electronic device having an optical system for capturing an image comprising:

a focusing mechanism for moving said optical system to an auto-focusing position or a fixed focus position;

a switch that functions as a focusing switch and also functions as a shutter switch, wherein

said switch according to a condition of operation orders a focusing action or the capturing of the image; and

a controller that decides whether the optical system is in a final lens position or not during a focusing action of said focusing mechanism due to said switch, and in the case where a shutter operation of said switch is performed under a state that the optical system is not in the final lens position, takes an image at a focus position in the middle of the focusing action; ~~and~~

~~an information presentation part that presents information showing that the image taken by the shutter operation is an image at the focus position in the middle of the focusing action,~~

wherein, during the focusing action, a focusing value is measured with an origin at a lens position where a focus position becomes an infinity, and if the measured focusing value is not smaller than a maximum focusing value, the decision is performed with making the measured focusing value into the maximum focusing value, and

wherein said controller compares between a time required for bringing into focus in said focusing mechanism and a time from starting of the focusing action until starting of said shutter operation, and changes said optical system to said auto-focusing position or said fixed focus position based on a result of the comparison.

Claim 7 (Original): The electronic device of claim 6, wherein said switch is provided as a first switch, and a switch which is used in photographing by a fixed focus is also provided as a second switch separated from the first switch.

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Claim 8 (Original): The electronic device of claim 6, wherein said switch functions as said focusing switch at a state of a half-push and functions as said shutter switch at a state of a full-push.

Claim 9 (Currently amended): The electronic device of claim 6 further comprising:
a first housing part that has said optical system~~imaging part~~;
a second housing part that has said switch; and
a coupling part that couples said first housing part and said second housing part so that the first and second housing parts can be folded up.

Claim 10 (Currently amended): A photographing control method of an electronic device having an imaging part which catches an image obtained through an optical system, and a focusing mechanism which moves said optical system to an auto-focusing position or a fixed focus position, comprising:

a process that detects a shutter operation in the middle of a focusing action of said focusing mechanism;

a process that measures a focusing value with an origin at a lens position where a focus position becomes an infinity, during the focusing action;

a process that makes the measured focusing value into a maximum focusing value if the measured focusing value is not smaller than a maximum focusing value;

a process that decides whether the optical system is in a final lens position or not during a

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focusing action of the focusing mechanism;

a process that detects said shutter operation and, if the optical system is not in the final lens position, switches to said fixed focus position from said auto-focusing position of said optical system under the focusing action;

a process that compares between a time required for bringing into focus in said focusing mechanism and a time from starting of the focusing action until starting of said shutter operation, and changes said optical system to said auto-focusing position or said fixed focus position based on a result of the comparison; and

a process that takes a fixed focus image caught at said fixed focus; ~~and~~

~~a process that presents information showing that the image taken by the shutter operation is a fixed focus image.~~

Claim 11 (Original): The photographing control method of the electronic device of claim 10 further including a process that superimposes a focusing mark representative of a distance between a pictured object and the optical system on an image, in the middle of said focusing action, which is caught by said imaging part, and displays it.

Claim 12 (Currently amended): A photographing control method of an electronic device having an imaging part which catches an image obtained through an optical system, and a focusing mechanism which moves said optical system to an auto-focusing position or a fixed focus position,

comprising:

a process that detects a shutter operation in the middle of a focusing action of said focusing mechanism;

a process that measures a focusing value with an origin at a lens position where a focus position becomes an infinity, during the focusing action;

a process that makes the measured focusing value into a maximum focusing value if the measured focusing value is not smaller than a maximum focusing value;

a process that decides whether the optical system is in a final lens position or not during a focusing action of the focusing mechanism;

a process that detects said shutter operation and, if the optical system is not in the final lens position, takes an auto-focusing image caught by said imaging part in the middle of the focusing action; and

a process that compares between a time required for bringing into focus in said focusing mechanism and a time from starting of the focusing action until starting of said shutter operation, and changes said optical system to said auto-focusing position or said fixed focus position based on a result of the comparison presents information showing that the image taken by the shutter operation is an auto-focusing image.

Claim 13 (Currently amended): A computer readable recording medium storing a photographing control program of an electronic device having an imaging part which catches an

image obtained through an optical system, and a focusing mechanism which moves said optical system to an auto-focusing position or a fixed focus position, the control program comprising:

detecting a shutter operation in the middle of a focusing action of said focusing mechanism;

measuring a focusing value with an origin at a lens position where a focus position becomes an infinity, during the focusing action;

making the measured focusing value into a maximum focusing value if the measured focusing value is not smaller than a maximum focusing value;

deciding whether the optical system is in a final lens position or not during a focusing action of the focusing mechanism;

detecting said shutter operation and, if the optical system is not in the final lens position, switches to said fixed focus position from said auto-focusing position of said optical system under the focusing action;

comparing between a time required for bringing into focus in said focusing mechanism and a time from starting of the focusing action until starting of said shutter operation, and changing said optical system to said auto-focusing position or said fixed focus position based on a result of the comparison; and

taking a fixed focus image caught at said fixed focus; ~~and~~

~~generating presentation information showing that the image taken by the shutter operation is a fixed focus image.~~

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Claim 14 (Currently amended): A computer readable recording medium storing a photographing control program of an electronic device having an imaging part which catches an image obtained through an optical system, and a focusing mechanism which moves said optical system to an auto-focusing position or a fixed focus position, the control program comprising:

detecting a shutter operation in the middle of a focusing action of said focusing mechanism;

measuring a focusing value with an origin at a lens position where a focus position becomes an infinity, during the focusing action;

making the measured focusing value into a maximum focusing value if the measured focusing value is not smaller than a maximum focusing value;

deciding whether the optical system is in a final lens position or not during a focusing action of the focusing mechanism;

detecting said shutter operation and, if the optical system is not in the final lens position, takes an auto-focusing image caught by said imaging part in the middle of the focusing action; and

comparing between a time required for bringing into focus in said focusing mechanism and a time from starting of the focusing action until starting of said shutter operation, and changing said optical system to said auto-focusing position or said fixed focus position based on a result of the comparison ~~generating presentation information showing that the image taken by the shutter operation is an auto-focusing image.~~

Claim 15 (Currently amended): An integrated circuit to which an imaging part catching an

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image obtained through an optical system and a focusing mechanism moving said optical system to an auto-focusing position or a fixed focus position are connected externally, comprising:

a detection part that detects a shutter operation in the middle of a focusing action of said focusing mechanism and a focusing value measured with an origin at a lens position where a focus position becomes an infinity, during the focusing action; and

a control part that decides whether the optical system is in a final lens position or not and, on the basis of a detection of said shutter operation of said detection part, switches to said fixed focus position from said auto-focusing position of said optical system under the focusing action and takes a fixed focus image caught at said fixed focus if the optical system is not in the final lens position,

wherein said control part makes the measured focusing value into a maximum focusing value to perform the decision if the measured focusing value is not smaller than a maximum focusing value, and

wherein said control part compares between a time required for bringing into focus in said focusing mechanism and a time from starting of the focusing action until starting of said shutter operation, and changes said optical system to said auto-focusing position or said fixed focus position based on a result of the comparison~~generates presentation information showing that the image taken by the shutter operation is a fixed focus image.~~

Claim 16 (Currently amended): An integrated circuit to which an imaging part catching an

image obtained through an optical system and a focusing mechanism moving said optical system to an auto-focusing position or a fixed focus position are connected externally, comprising:

a detection part that detects a shutter operation under a focusing action of said focusing mechanism and a focusing value measured with an origin at a lens position where a focus position becomes an infinity, during the focusing action; and

a control part that decides whether the optical system is in a final lens position or not and takes an auto-focusing image in the middle of the focusing action based on a detection of said shutter operation of said detection part if the optical system is not in the final lens position,

wherein said control part makes the measured focusing value into a maximum focusing value to perform the decision if the measured focusing value is not smaller than a maximum focusing value, and

wherein said control part compares between a time required for bringing into focus in said focusing mechanism and a time from starting of the focusing action until starting of said shutter operation, and changes said optical system to said auto-focusing position or said fixed focus position based on a result of the comparison ~~generates presentation information showing that the image taken by the shutter operation is an auto-focusing image.~~

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